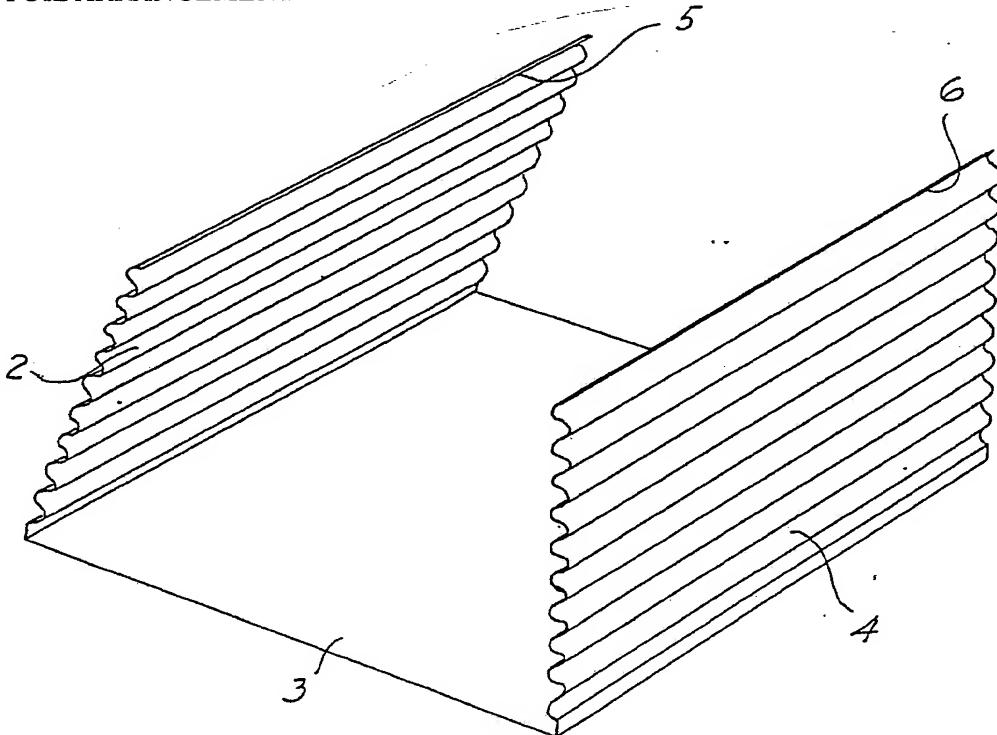




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 3 : F28D 9/02		A1	(11) International Publication Number: WO 83/ 03464 (43) International Publication Date: 13 October 1983 (13.10.83)
(21) International Application Number: PCT/SE83/00036 (22) International Filing Date: 3 February 1983 (03.02.83)		(81) Designated States: AT (European patent), CH (European patent), DE (European patent), DK, FI, GB (European patent), NL (European patent), NO, US.	
(31) Priority Application Number: 8201938-1 (32) Priority Date: 26 March 1982 (26.03.82)		Published <i>With international search report.</i>	
(33) Priority Country: SE			
(71) Applicant (for all designated States except US): PLÄT-MEKANO-I KVÄNUM AB [SE/SE]; Box 300, S-535 00 Kvänum (SE).			
(72) Inventors; and (75) Inventors/Applicants (for US only) : ANDERSSON, Ber-til [SE/SE]; Sveag. 4, S-535 00 Kvänum (SE). CARLSS-ON, Leif [SE/SE]; Skolg. 39, S-565 00 Mullsjö (SE).			
(74) Agent: LAUTMANN, Kurt; Box 45, S-691 21 Karlsko- ga (SE).			

(54) Title: FOIL ARRANGEMENT



(57) Abstract

A plate heat-exchanger consisting of a frame in which flat and corrugated foils are stacked, the foils being alternately flat and corrugated. Stacking is simplified, and even sealing, by the use of a unit consisting of a flat (3) and a corrugated foil (2 and 4), both being produced from a single blank.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	LI	Liechtenstein
AU	Australia	LK	Sri Lanka
BE	Belgium	LU	Luxembourg
BR	Brazil	MC	Monaco
CF	Central African Republic	MG	Madagascar
CG	Congo	MR	Mauritania
CH	Switzerland	MW	Malawi
CM	Cameroon	NL	Netherlands
DE	Germany, Federal Republic of	NO	Norway
DK	Denmark	RO	Romania
FI	Finland	SE	Sweden
FR	France	SN	Senegal
GA	Gabon	SU	Soviet Union
GB	United Kingdom	TD	Chad
HU	Hungary	TG	Togo
JP	Japan	US	United States of America
KP	Democratic People's Republic of Korea		

- 1 -

Foil arrangement

The present invention relates to a foil arrangement in a plate heat-exchanger. Such a heat-exchanger is generally in the shape of a cube formed by a frame. The flat and corrugated foils are arranged alternately within the cube. The corrugated foils located on top of each other are arranged so that the direction of one foil deviates by 90° from the direction of the foils located above and below it. During assembly of such plate heat-exchangers a flat foil must first be inserted, then a corrugated foil, followed by a flat foil, and so on. This procedure is tedious and time-consuming. Furthermore, it is difficult to ensure satisfactory sealing at the edges of a flat and corrugated foil which are parallel to the direction of flow.

The object of the present invention is to eliminate the drawbacks mentioned above and this is done by using a single blank, not divided into several parts, to form a unit consisting of both a flat and a corrugated foil. The starting blank consists of a rectangular foil with three consecutive fields, the middle field being flat and the other two fields corrugated. A blank of this type can be produced in a machine. The corrugated fields of the blank thus produced are folded towards each other so that the free end edges of the latter fields are in contact with each other and are joined in some manner. The two corrugated fields may be of equal or unequal length.

According to an alternative the middle field may constitute the corrugated part and the end fields the flat parts. In this alternatively the edges of the flat parts are joined together.

Meeting edges may be joined together in various ways, such as by welding, glueing, riveting or the like. Meeting edges in the preceding alternative may also be just located opposite each other, either spaced or in contact with each other. The foils should preferably be of aluminium. Other materials are also possible, such as cardboard, plastic, pasteboard.



Additional characteristics of the present invention are revealed in the following claims.

The present invention will be further described with reference to the accompanying two sheets of drawings, in which

5 Figure 1 shows a blank for manufacture of a unit for a plate heat-exchanger,

Figure 2 shows the blank being folded and

Figure 3 shows the finished unit.

The blank shown in Fig.1 has been obtained by passing a sheet of plastic foil the same width as the blank 1 through a machine which forms the sheet into consecutive fields, alternate fields 3 being flat and preceding and subsequent fields 2 and 4 being corrugated. Blanks 1 are cut from the sheet and supplied to a machine to bend the fields 2 and 4 as shown in Figure 2. When bending is complete the end edges 5 and 6 are in contact with each other. These edges can be joined in any manner whatsoever. In the present case the intention is that they shall be joined by welding or glueing. A finished unit is shown in Fig.3, the join being designated 7. It is also possible to refrain from joining the edges 5 and 6. In this case it is advisable for the edges 5 and 6 to be located opposite each other. They may either be edge to edge or spaced from each other. From Fig.3 it is clear that when a plate heat-exchanger is to be assembled, only the unit shown in the latter figure is required, that is to say, only one product which is placed in a certain direction, the next being turned 90° in relation thereto, and so on. Each unit is automatically sealed at the edges parallel to the direction of flow.



CLAIMS

1. Foil arrangement in plate heat-exchangers in which the foils are alternately flat and corrugated and in which corrugated foils are directed alternately in one direction and in a direction 90° thereto, characterised in that a flat foil (3) consisting of one or two parts and a corrugated foil (2 and 4) consisting of one or two parts, 5 form a coherent unit.
2. Foil arrangement according to claim 1, characterised in that the flat foil (3) and corrugated foil (2 and 4) of the unit are produced from a single blank (2-4).
- 10 3. Foil arrangement according to claim 2, characterised in that the blank consists of a flat intermediate part (3) and two corrugated parts (2 and 4) located one on each side of the intermediate part (3) and designed to be folded, the free ends (5 and 6) to be joined by means of welding, glueing, riveting or the like.
- 15 4. Foil arrangement according to claim 3, characterised in that the intermediate part is corrugated and the parts on each side thereof are flat.
5. Foil arrangement according to claim 3 or 4, characterised in that the 20 gap between the opposite edges (5 and 6) of the free ends, when not joined, varies from zero upwards.



1/2

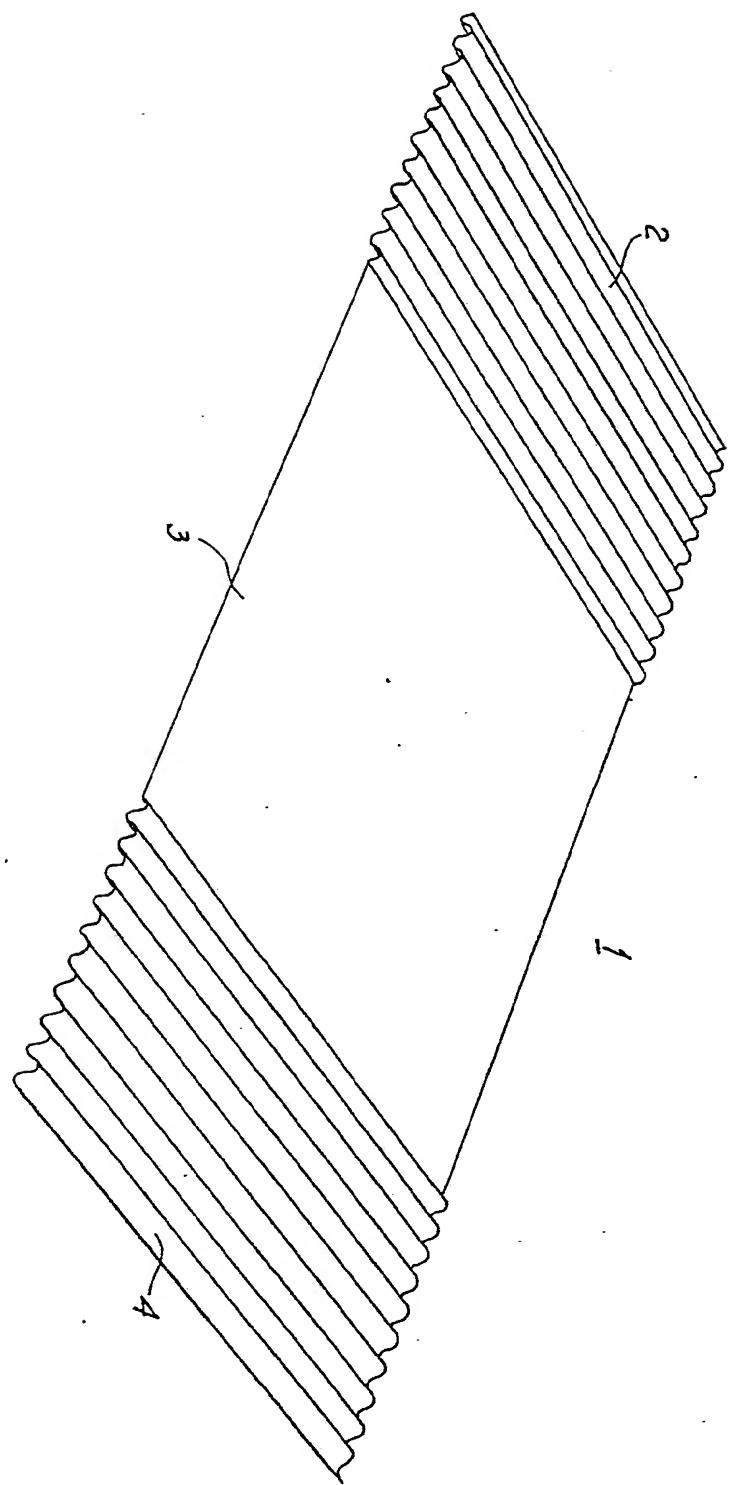


FIG. 1

2/2

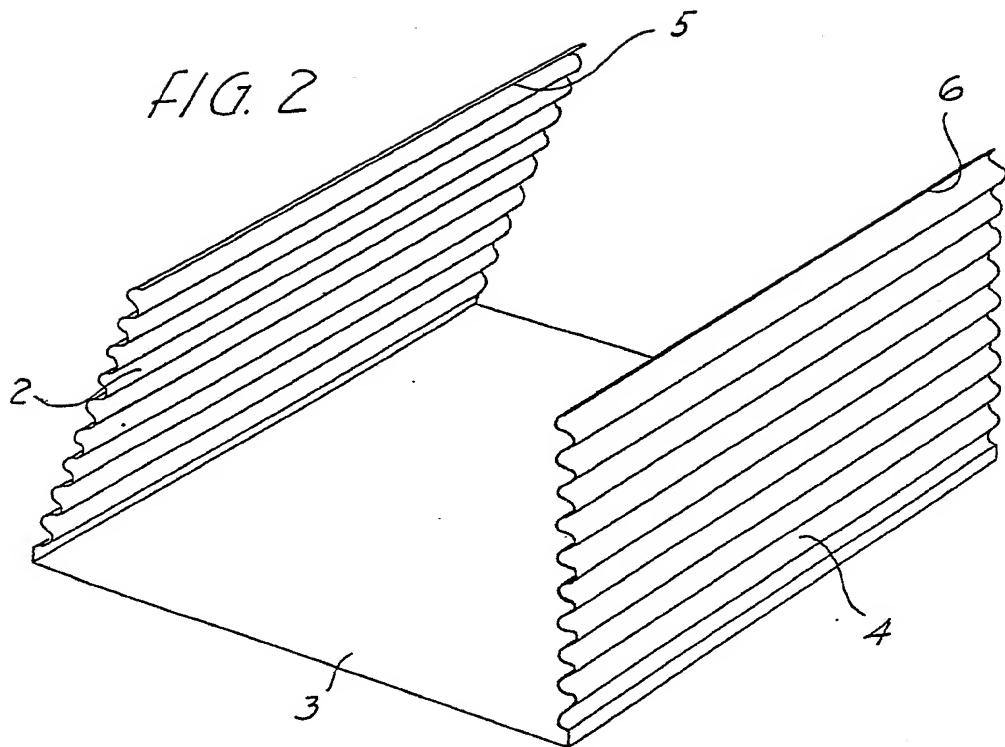
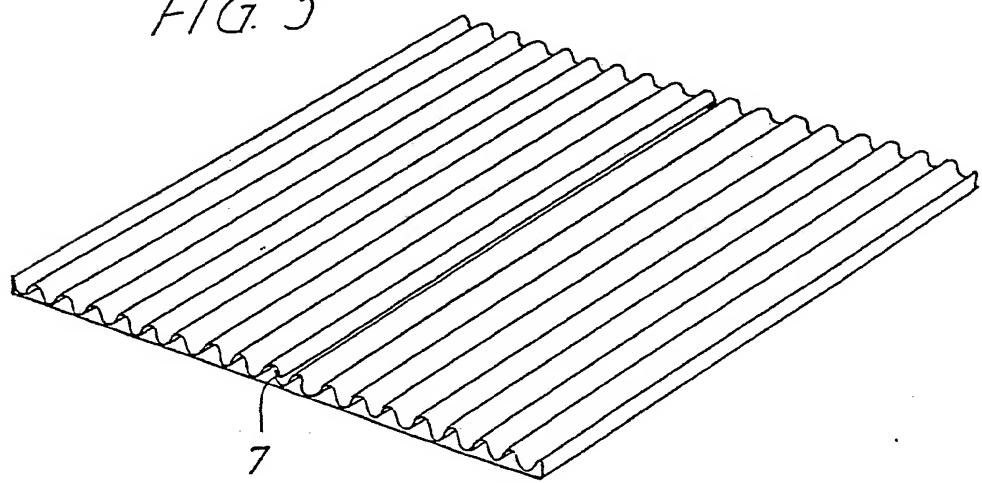


FIG. 3



INTERNATIONAL SEARCH REPORT

International Application No. PCT/SE83/00036

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *

According to International Patent Classification (IPC) or to both National Classification and IPC

3

F 28 D 9/02

II. FIELDS SEARCHED

Minimum Documentation Searched 4

Classification System	Classification Symbols
IPC 3	F 28 D 9/00, 9/02, B 21 D 53/02
US C1	<u>29:157.3</u> ; <u>113:118</u>

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched 5

SE, NO, DK, FI classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT 16

Category *	Citation of Document, 16 with indication, where appropriate, of the relevant passages 17	Relevant to Claim No. 18
Y	NO, B, 143 115 (AB SVENSKA FLÄKTFABRIKEN) 8 September 1980	1-4
Y	DE, B, 1 025 821 (GENERAL MOTORS CORP) 13 March 1958	1-4

* Special categories of cited documents: 16

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search *

1983-06-17

Date of Mailing of this International Search Report *

1983-06-29

International Searching Authority *

Swedish Patent Office

Signature of Authorized Officer 10

Sune Söderling

Sune Söderling